SM Project P-2210
Release Protocol Analysis

Presented to:

VA Roanoke River Basin Advisory Committee

5 April 2004

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Protocol Evaluation Committee

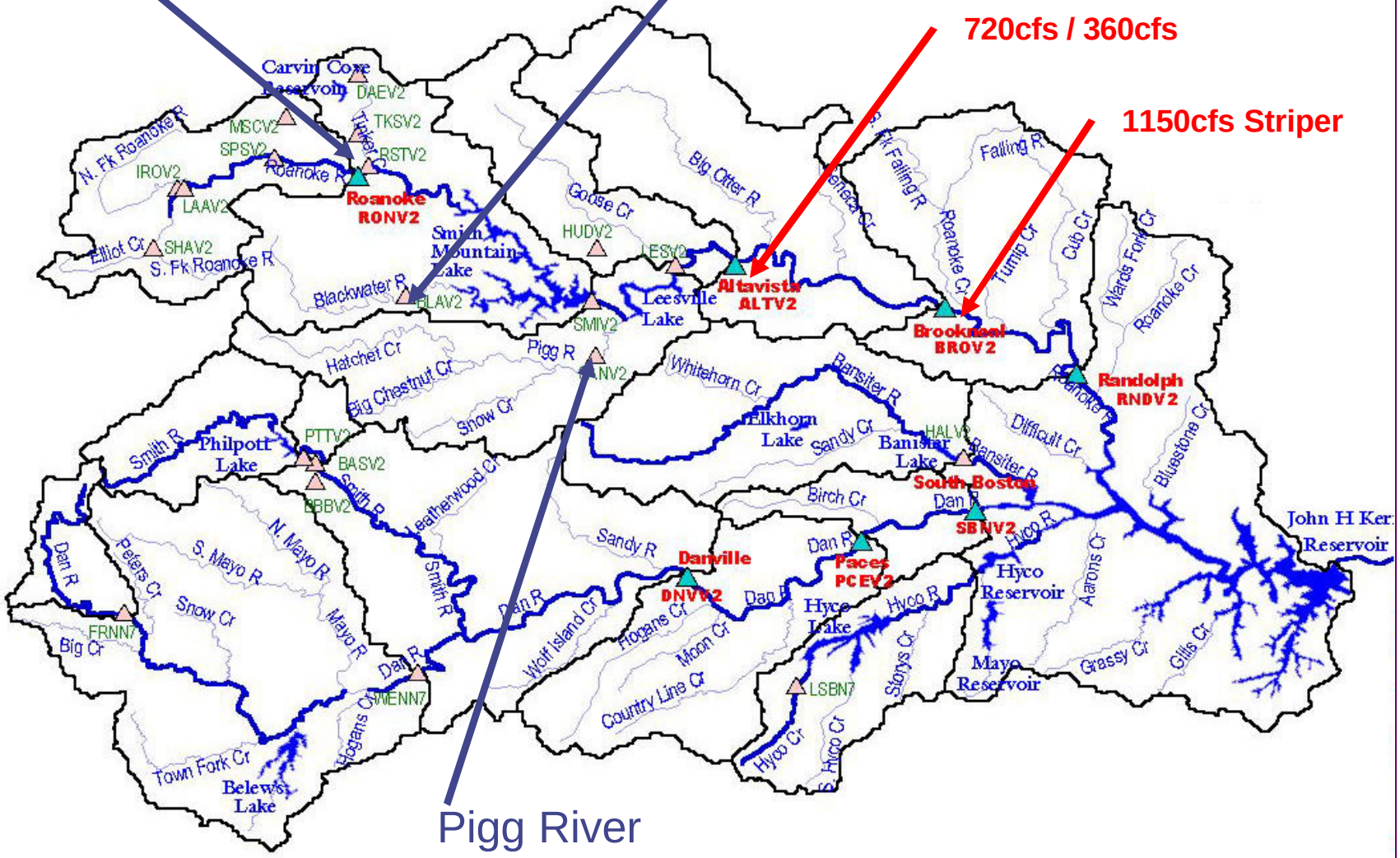
Report Published 15 January 2004

Membership

J. Johnson Eller, esq.	Chairman	Altavista/SML
Bill Brush	member	SML Bedford
J.T. Davis	member	Friends of Staunton River
John Lindsey	member	SML Pittsylvania
Shelton Miles	member	Citizens for Preservation of the River
Bill Reidenbach	member	SML Franklin
Teresa Rogers	member	Reservoir Mgr, AEP

Roanoke River @ Roanoke

Blackwater River



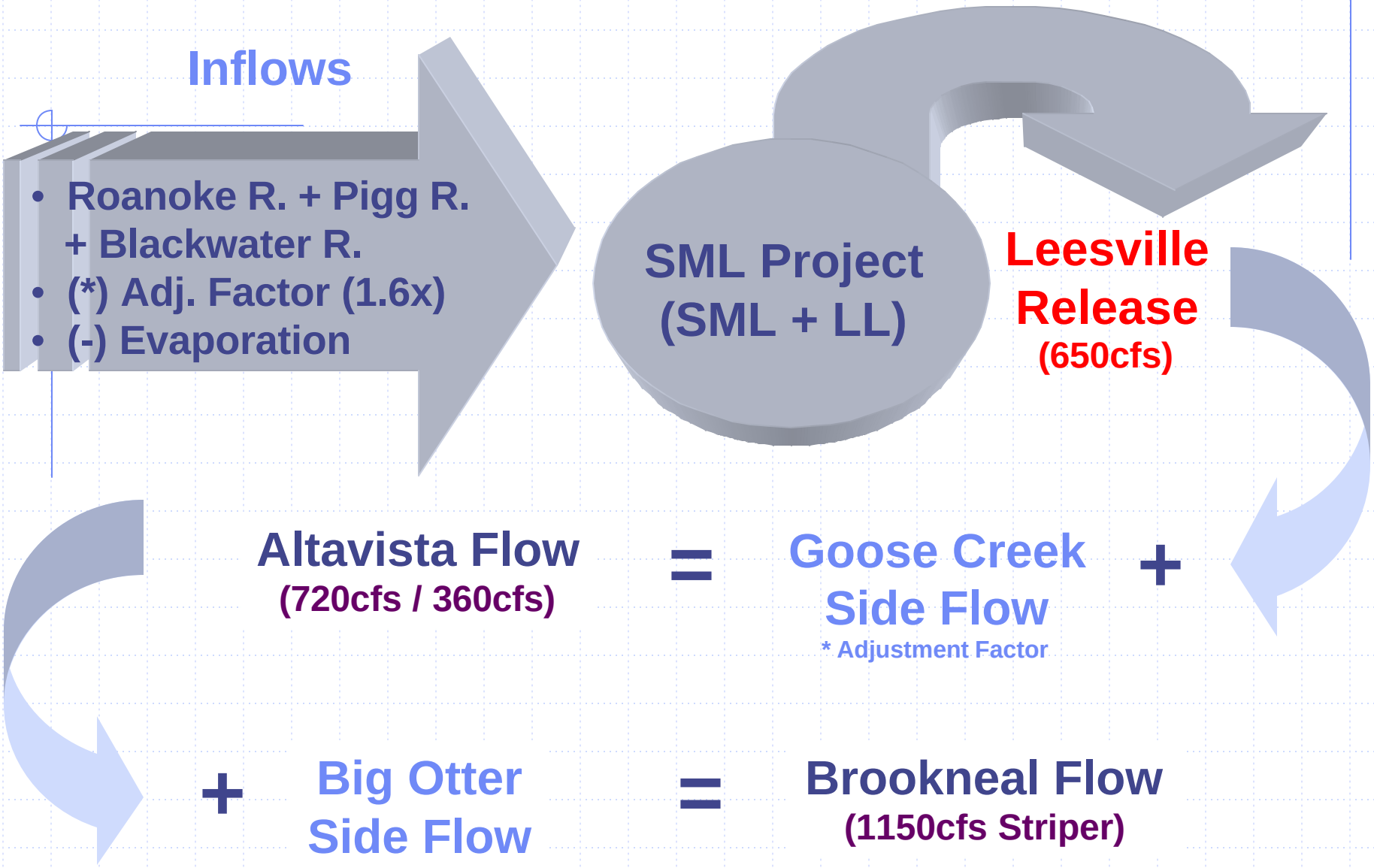
Pigg River

Roanoke Basin

Project Familiarization

1. Project Size = 24,100 acres, 372,121,842,000 gallons
   - 20,700 acres (SML) + 3,400 acres Leesville Lake (LL)
2. Main Inflows = Roanoke R. Blackwater R. & Pigg R.(LL)
3. SML Adj. = 795ft SML + 600ft LL = Full Pond
4. SML Actual = SML level only
5. Discharge Protocol is for Leesville Dam
   - 650cfs for 1 Month = 12,603,181,500 gallons
   - 1.0 ft Lake Level = 400cfs for one Month / 7,755,804,000 gal
6. No Loss of Water for Power Generation
   - 2 ft. Pumped Storage Power Pool (LL)

Basic Volumetric Model



Volumetric Analysis Data Sources

Historical Data to Evaluate Release Protocol Performance

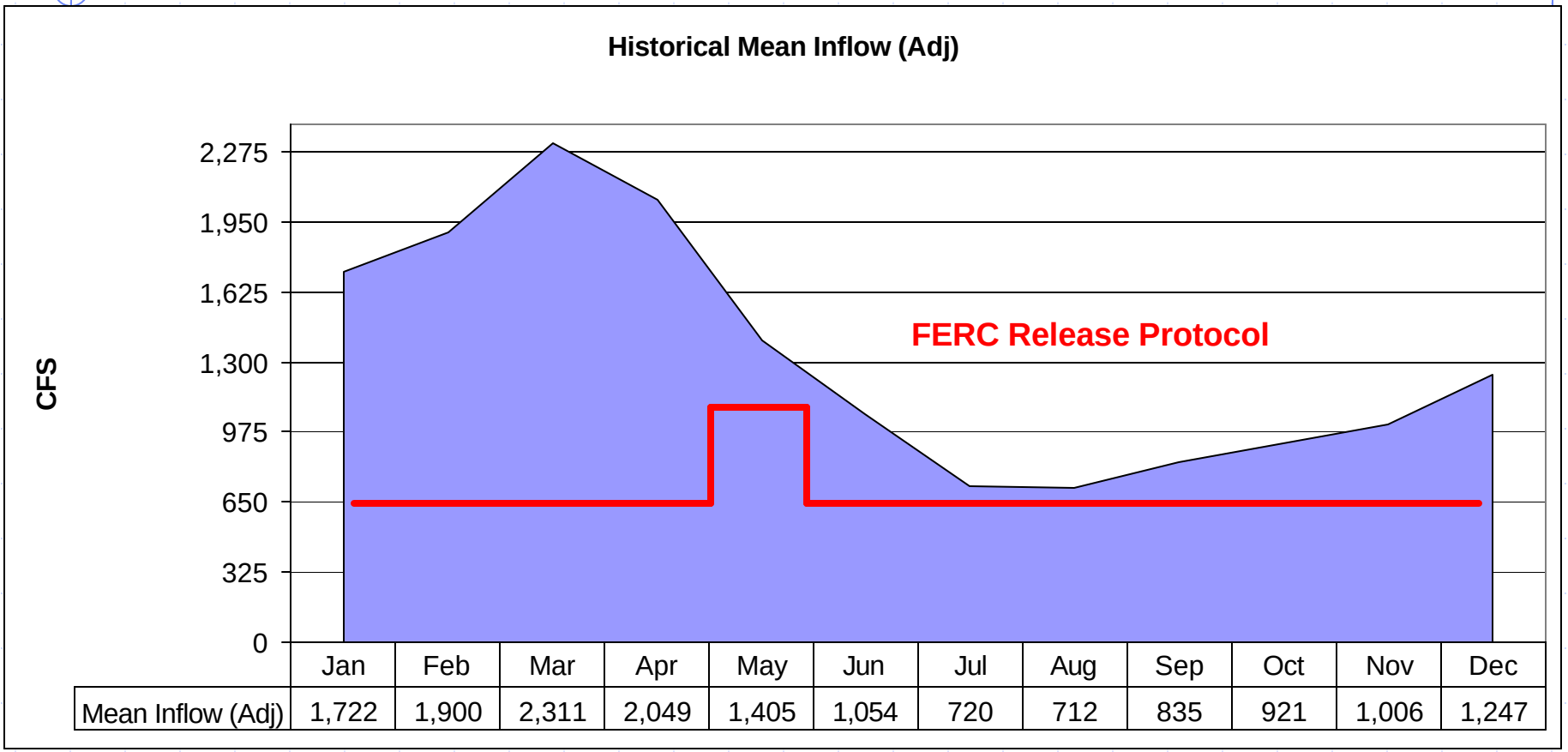
- USGS Mean Monthly Flows
  - Inflows -- Roanoke R. Blackwater R. & Pigg R.
  - Side-Flows -- Goose Creek, Big Otter
  - Main Down-Stream Flows -- Altavista, Brookneal
- ACOE Historical Mean Monthly Evaporation
  - Philpott Lake
- AEP Hourly Data from 1998 thru 2002
  - Leesville Release
  - SML Adjusted Level

The Need for a Better Protocol

Balance

Historical Monthly Average Inflows

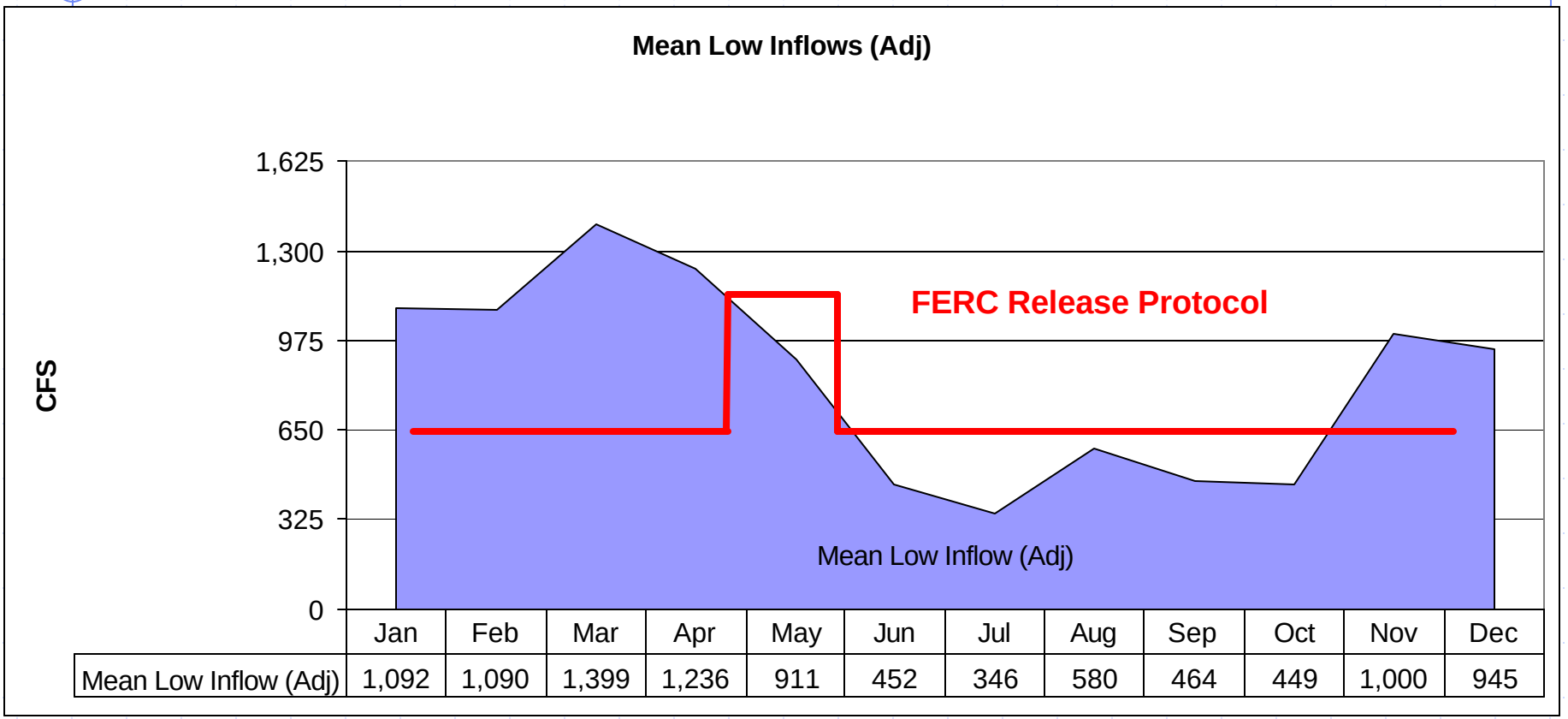
Since Data Inception
(Factor 1.6 less Evaporation)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Inflow (Adj)	1,722	1,900	2,311	2,049	1,405	1,054	720	712	835	921	1,006	1,247

Historical Monthly Average Inflows

Expected Low Flow Conditions 1967 - 2002 Data (Factor 1.6 less Evaporation)

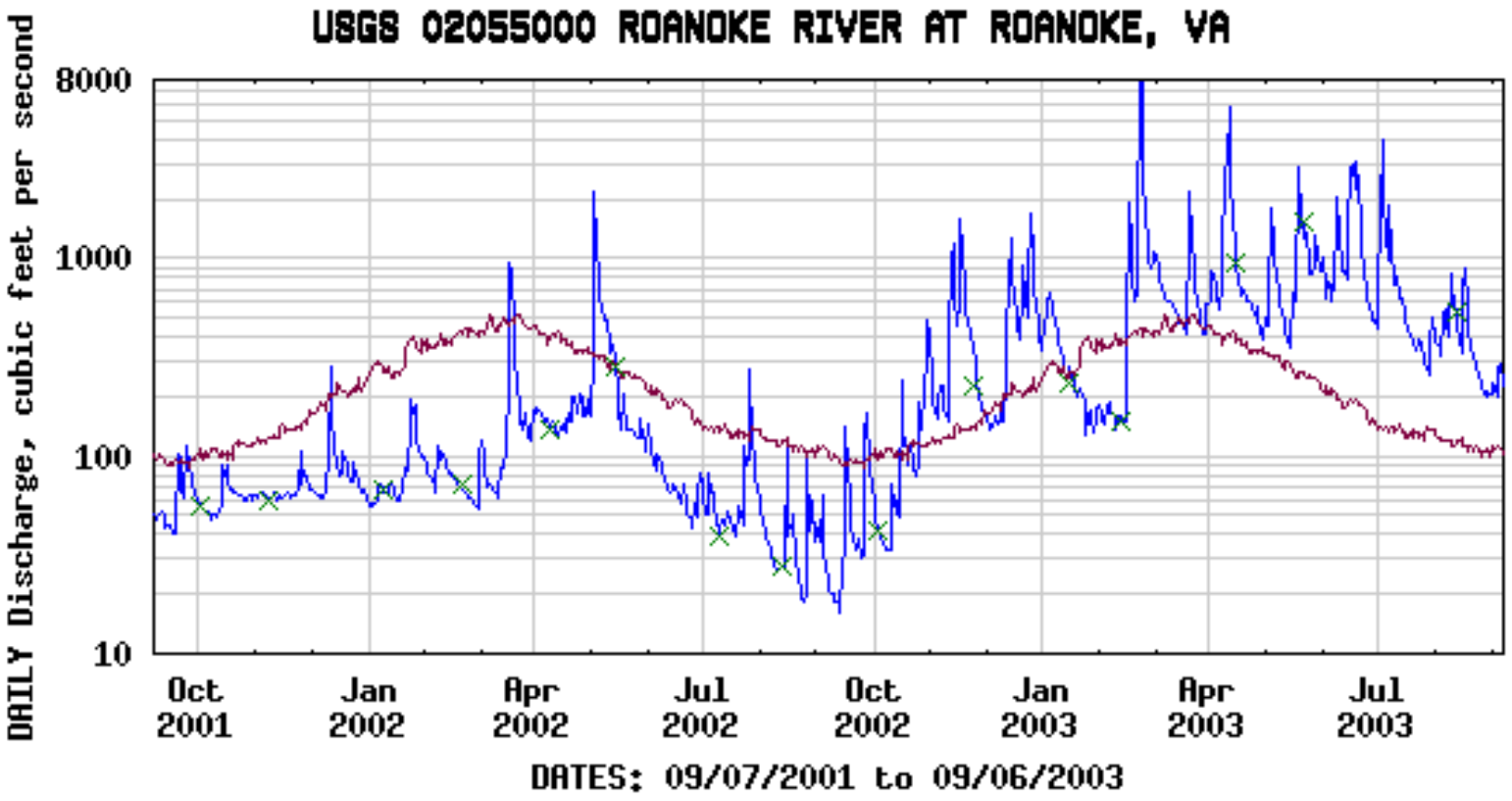


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Low Inflow (Adj)	1,092	1,090	1,399	1,236	911	452	346	580	464	449	1,000	945

A Record Drought

Sept. 1998 thru Sept. 2002

USGS



Provisional Data Subject to Revision

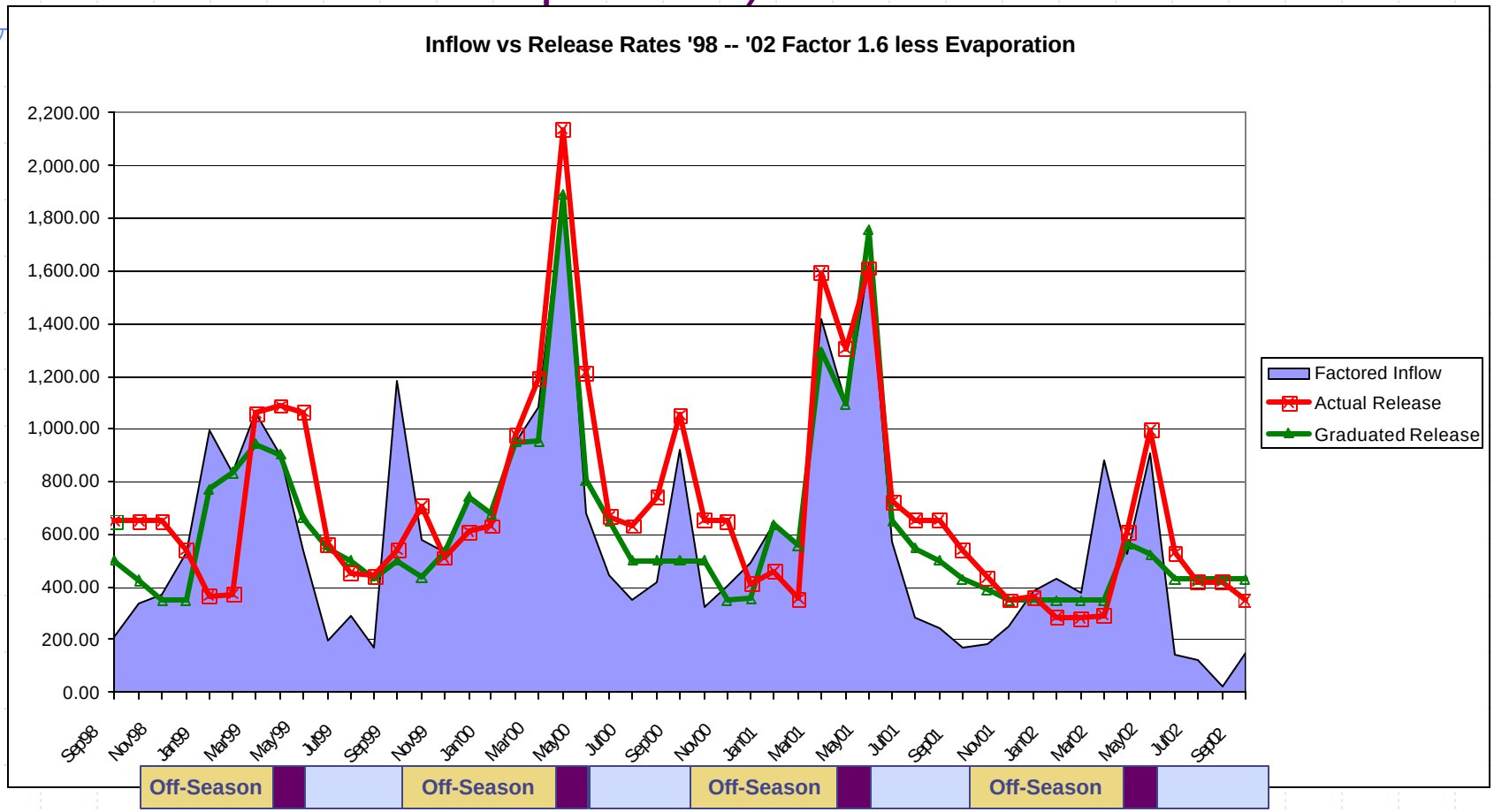
Graduated Step Release Protocol

Conserve Water Resource to Meet Required Needs

- **Winter Objective: Restore Full Pond** (15 October to 1 March)
  - **Minimum Release 350cfs (If Required)**
- **Spring Objective: Super-Charge to Support Striper Spawn** (1 March to Striper Spawn Start)
  - **Minimum Release 525cfs (If Required)**
- **Late Spring Objective: Support Striper Spawn** (15 April to 30 May)
  - **Minimum Release 525cfs (If Required)**
- **Summer Objective: Support River and Lake Recreation** (End of Striper Spawn through October 15)
  - **Two Step Minimum Release 500cfs & 400cfs (If Required)**

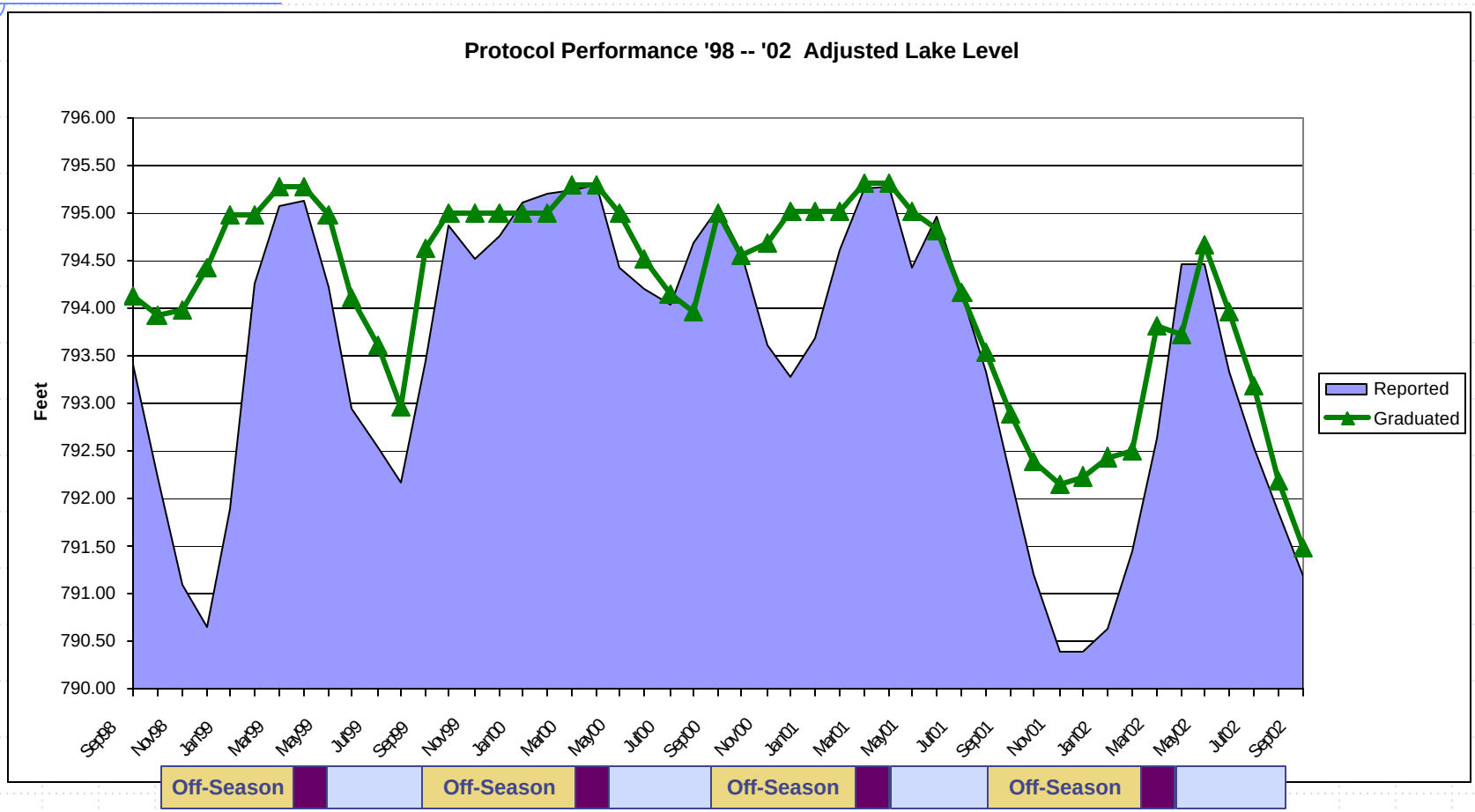
Inflow vs. Release Protocol 1998 – 2002

(Factored 1.6 less Evaporation)



Adjusted Lake Level 1998 – 2002

(Factor 1.6 less Evaporation)

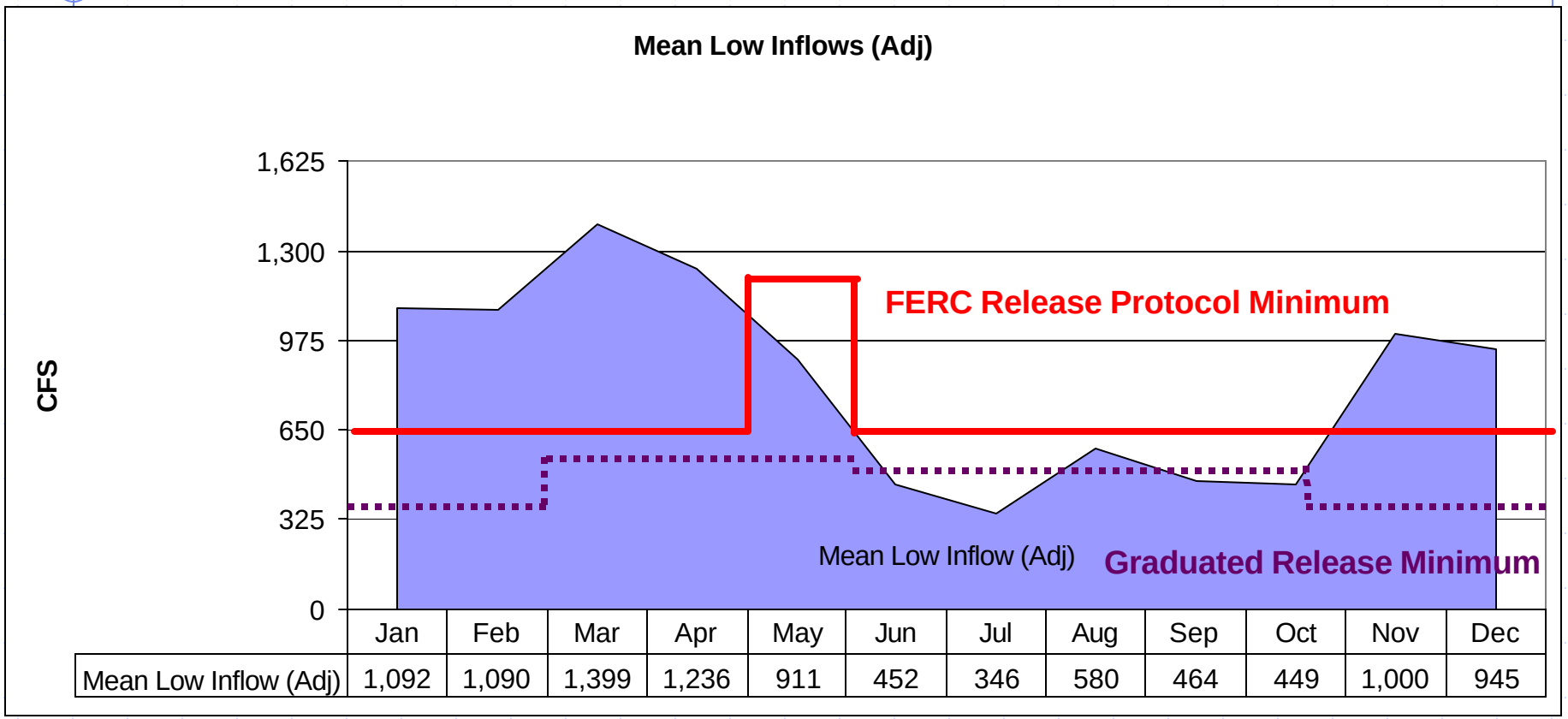


Protocol Performance Comparison

Under Expected Low Flow Conditions

Historical Monthly Inflows

Expected Low Flow Conditions 1967-2002 (Factor 1.6 less Evaporation)



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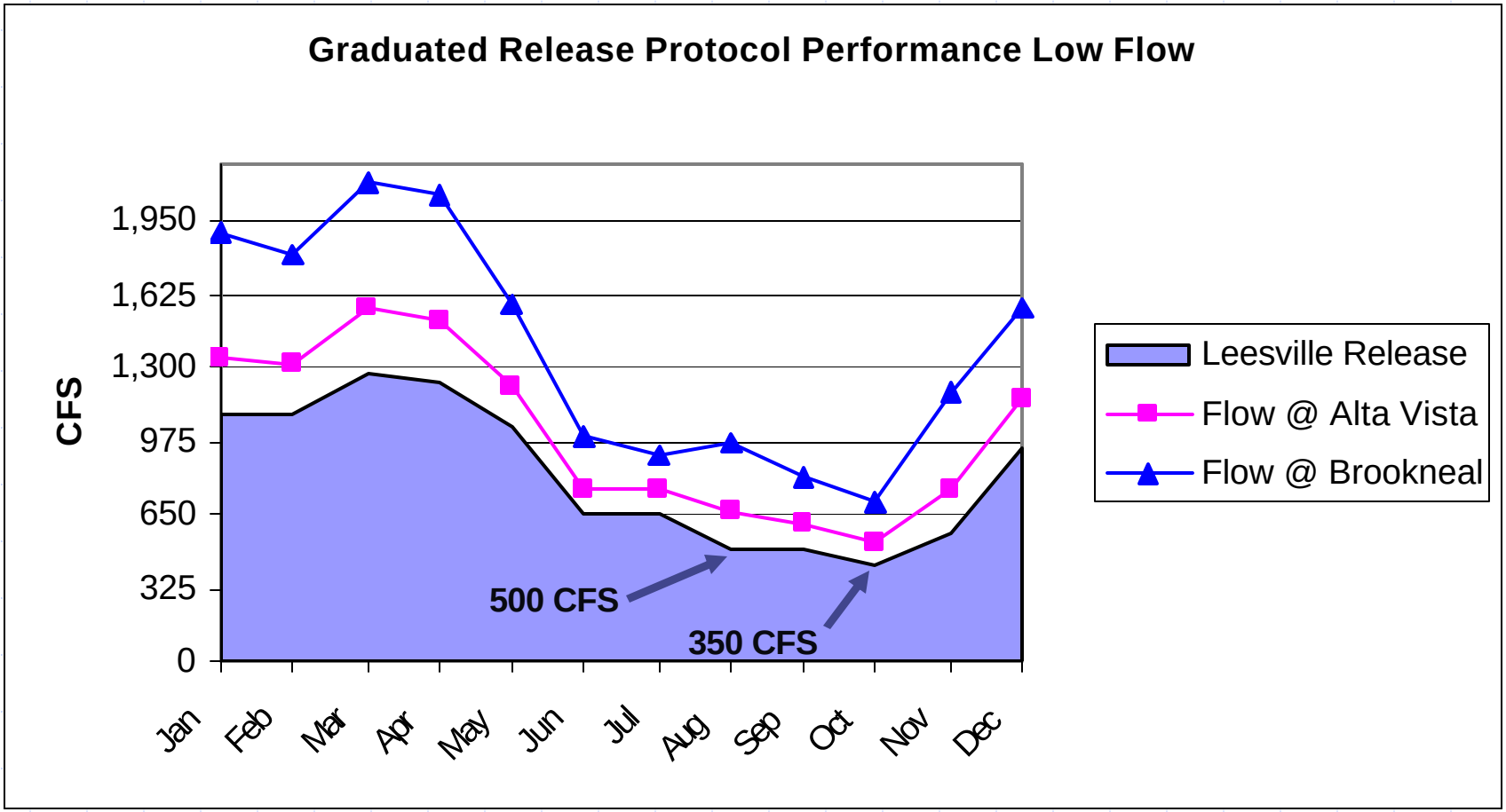
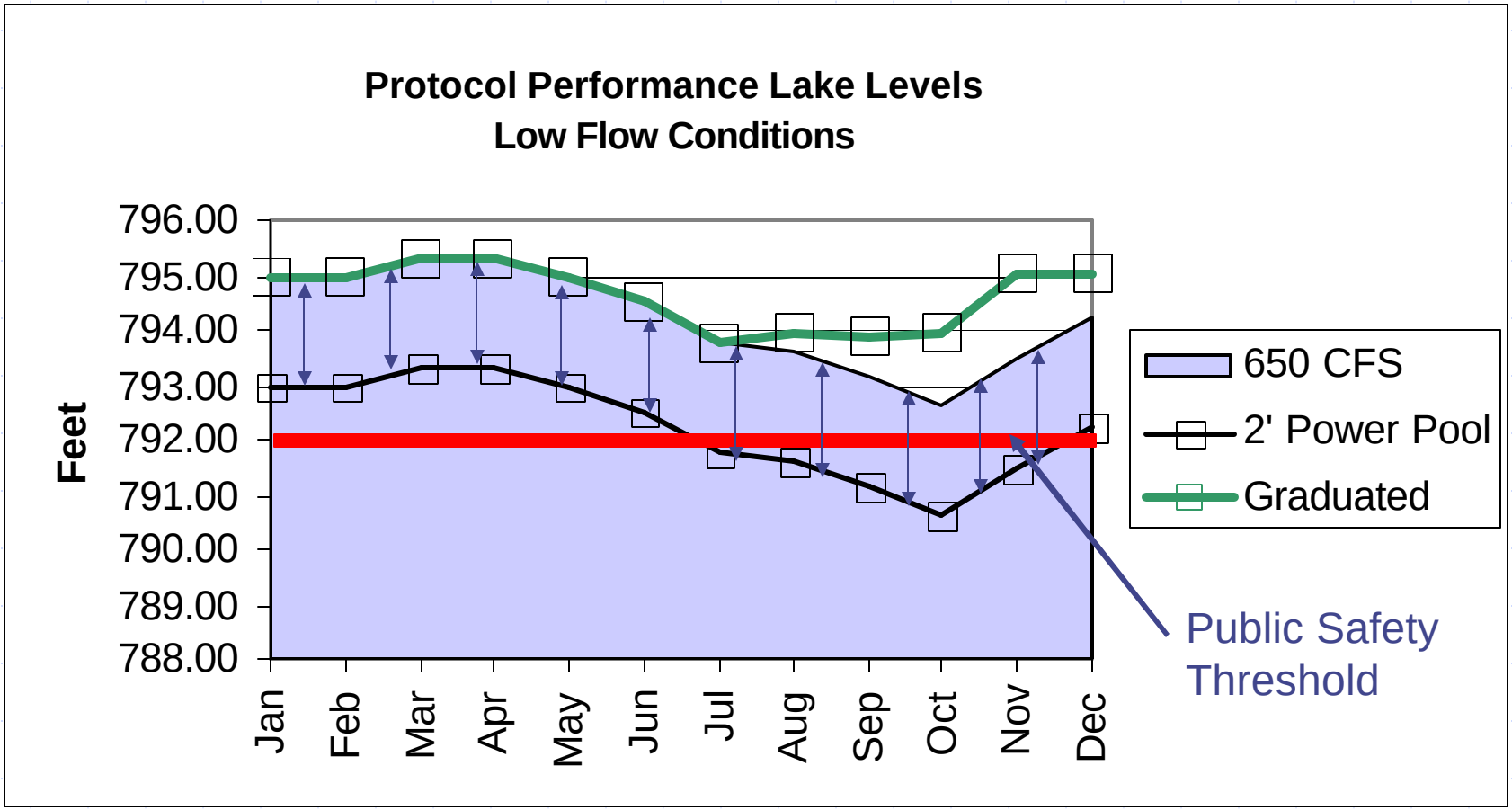
Graduated Release Protocol

Expected Low Flow Conditions 1967-2002 (Factor 1.6 less Evaporation)



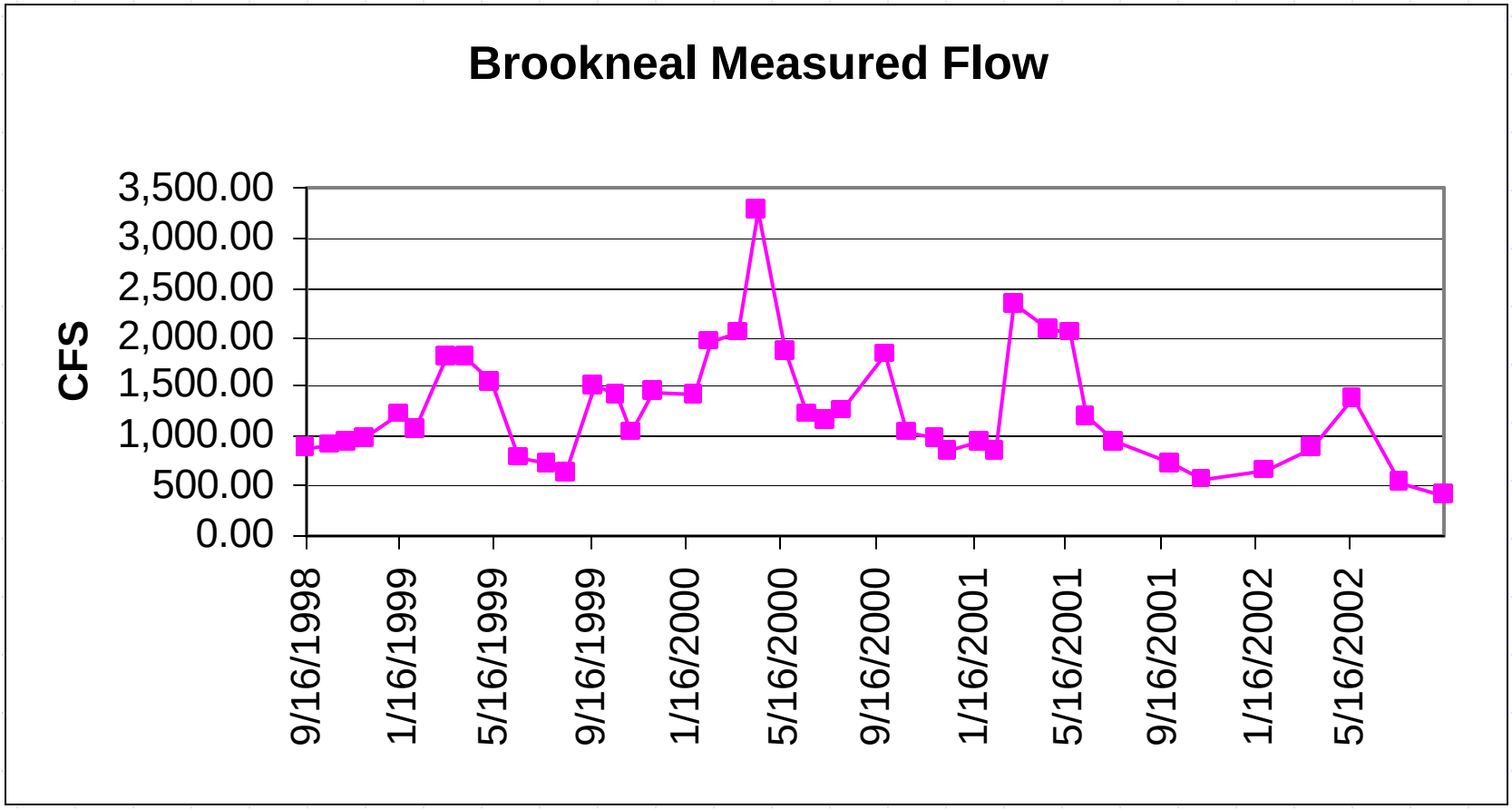
Performance -- Adjusted Lake Level

Expected Low Flow 1967-2002 Data
(Factor 1.6 less Evaporation)



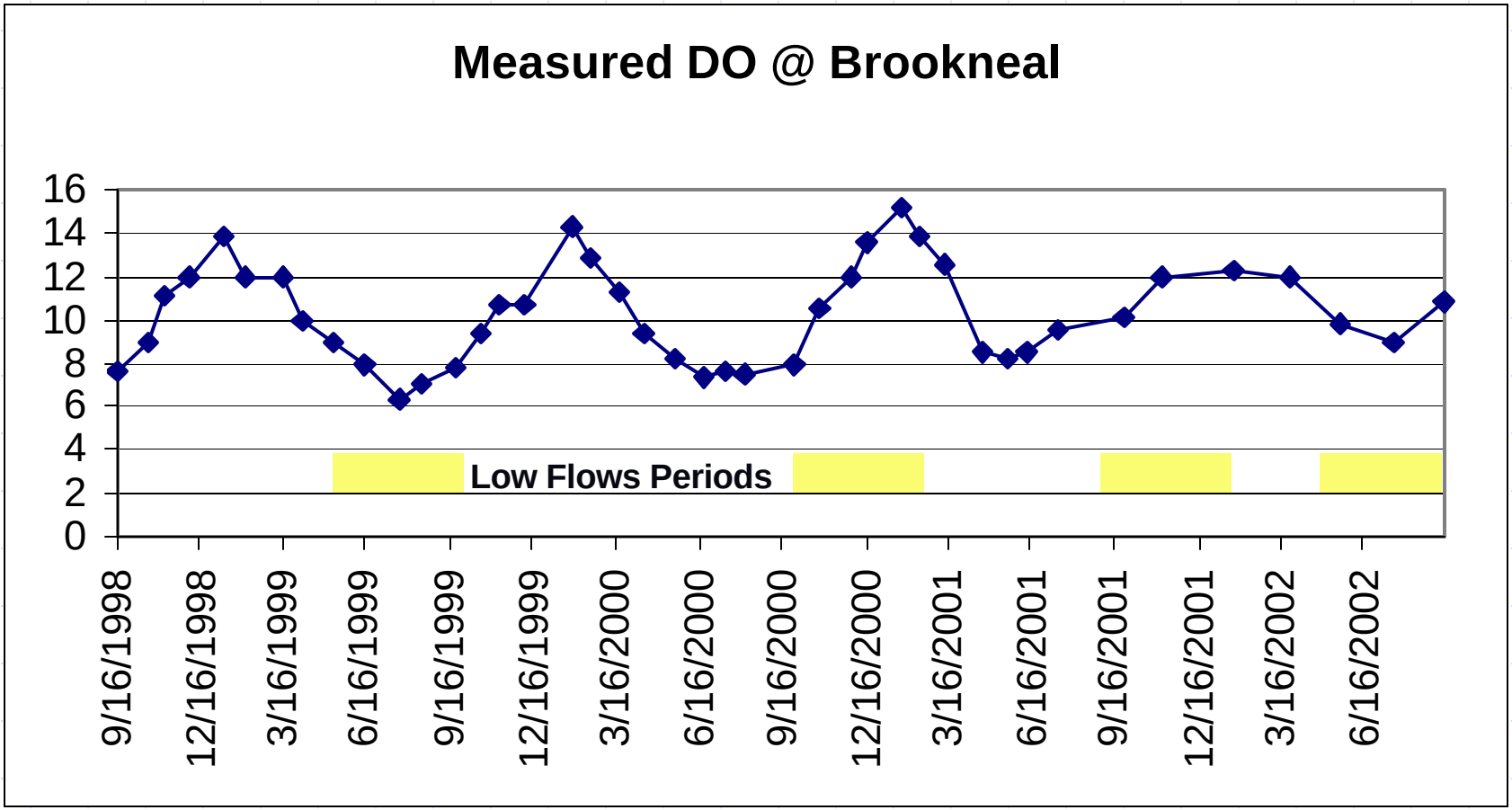
USGS Measured Flows @ Brookneal

1998 thru 2002



DEQ DO Content @ Brookneal

DO More Sensitive to Temperature than Flow Volume



Conclusions

- Graduated Release Protocol Superior
  - Balanced in Meeting Up & Down Stream Needs
  - Out Performs Current Protocol in Expected Low Inflow Conditions
  - Considers Future Public Water Withdrawals
  - Not All Committee Members in Agreement
    - Committee Report Published 15 January 2004

Recommendations

- Educate and Involve Lake Community
  - TLAC/Lake & Basin Organizations
  - County Governments
  - State Elected Officials/State Agencies
- Include Protocol in New AEP License
  - Encourage Testing and Study
  - Active Lobbying with Officials & Agencies

Request

- RRBAC Endorsement of the Process
  - Letter to FERC
  - cc AEP & Responsible State Agencies